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Colorectal Sarcoma: Analysis of Failure Patterns

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Background and Objectives: Colorectal sarcomas (CRS) are rare and their treatment remains controversial, especially for those located in the rectum. The aim of this paper is to evaluate our experience, with special emphasis on the failure pattern after surgical therapy alone or combined with postoperative radiotherapy.

Materials and Methods: The medical records and histological slides of 13 CRS patients treated between 1986 and 1996 were reviewed retrospectively.

Results: The patients included eight males and five females, with a median age of 54 years; nine of their primary tumors were located in the rectum, and four in the colon. The histologies were leiomyosarcoma in nine cases and malignant fibrous histiocytoma in four cases. Surgical treatment consisted of anatomical colectomy (four); local excision (three); abdominoperineal resection (APR)(two); low anterior resection (LAR)(two); LAR en bloc with the prostate (one), and total pelvic exenteration (one). One operative death occurred. The median size of the tumors was 8 cm (range, 5–40). The tumors were graded as low, three, and high, ten. The median follow-up was 24 months. Eight patients in the overall group developed recurrences as follows: local, three; local and distant, three, and distant, two. Five out of nine patients with rectal sarcoma received adjuvant postoperative radiotherapy (PRT). Local recurrence occurred in 20% (1/5) of those who received PRT, and in 100% (3/3) of those who did not. The overall 5-year survival was 40%, and the 5-year survival for patients with low-grade tumors was 66%, as compared with 22% for those with high-grade tumors.

Conclusions: The patterns of failure in CRS are combined in both local and distant sites. However, our results suggest that in rectal sarcoma, the use of surgery + PRT may reduce the local recurrence rate; in selected patients, it may allow for anal sphincter preservation.

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KEY WORDS: sarcoma; colon; rectum; radiotherapy; anal sphincter preservation

INTRODUCTION

The anatomical sites most frequently affected by gastrointestinal sarcomas are stomach, 50%; small intestine,

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30%; colorectal, 15%, and esophagus, 5% [1]. Colorectal sarcoma account for approximately 0.1% of all colorectal neoplasms [2]. At the Oncology Hospital of the National Medical Center from 1986 to 1996, 1,260 new patients with colorectal neoplasms were treated, and the estimated frequency of colorectal sarcomas was 1.03%. The most common histologies are leiomyosarcoma, fibrosarcoma and malignant fibrous histiocytoma. Recently, however, Kaposi's sarcoma has increased in association with the acquired immunodeficiency syndrome [3].

Some investigators have recommended anatomical resection for tumors located in the colon. Nevertheless, because of the rarity of this neoplasm, the elective treatment for rectal sarcoma has been controversial. The available literature consists of case reports and long series that provide no uniform therapeutic approach. Local excision is recommended for low-grade tumors and abdominoperineal resections (APR) for high-grade tumors [4,5]. However, the local recurrence rate with both operations remains high. Recently, Minsky has advocated the use of radiation therapy after surgery, with the goal of enhancing local control and anal sphincter preservation in both anal and rectal sarcoma [6,7].

The aim of this report is to evaluate our experience with this rare tumor, with special emphasis on recurrence patterns after surgical therapy only, and whether or not the administration of postoperative radiation therapy could modify this recurrence pattern.

MATERIALS AND METHODS

A retrospective review of medical records and histologic slides was done in cases with colorectal sarcoma treated at the Oncology Hospital of the National Medical Center from 1986 to 1996. The demographic variants, initial symptoms, diagnostic methods, tumor anatomical location, treatment of the primary tumor, sites of recurrence, and treatment of the recurrent disease were analyzed. In 12 patients, the presurgical consisted of a physical examination, complete blood count (CBC), chemical profile, chest radiography, and computed tomography (CT) scan.

Hematoxylin and eosin (H&E) preparations were examined in every case; in some cases, for review purposes, Masson's trichrome, periodic acid-Schiff (PAS), or immunocytochemical techniques such as vimentin, actin, and myosin stains were performed. In all cases, it was found that histologic material was available and adequate. The histologic parameters to evaluate the tumor grade are shown in Table I. The mitotic rate was determined by counting the number of mitotic figures in at least five sets of consecutive high-power (400×) fields in the most active areas of tumor. Cellularity was estimated as low, moderate, or high, based on the most cellular area. Nuclear pleomorphism was classified as none, slight, moderate, or marked, based on the most pleomorphic area. The follow-up period was calculated to be from the date of the initial surgical treatment. Survival curves and interval to recurrence data were measured by the Kaplan-Meier method [8]; survival curves were compared with the log-rank test.

TABLE I. Histologic Parameters of Colorectal Sarcomas

Grade	Parameters
Low	Well differentiated Moderate cellularity Lack of anaplasia 0–4 mitoses/10 high-power fields
High	Moderately or poorly differentiated Moderate or marked cellularity Mild or marked anaplasia >mitoses/10 high-power fields

RESULTS

The study included 13 patients, eight males, and five females, with a median age of 54 years (range, 30–80 years). The demographic characteristics are presented in Table II. The most important symptoms were pain, in 10 patients; tumor in seven; bleeding in two; intestinal occlusion in one, and pararectal abscess in one. The diagnosis of tumor was done by physical examination and complementary radiography in 12 patients, and by exploratory celiotomy due to intestinal occlusion in one patient. The primary tumor was located in the rectum in nine patients and in the colon in four. All patients were surgically treated with curative intent. The following surgical procedures were performed: for colonic tumors, anatomical colon resection (n = 4) and for rectal tumors local excision (n = 3); APR (n = 2); low anterior resection (n = 2); low anterior resection en bloc with the prostate (n = 1), and total pelvic exenteration in one patient, who died from intraoperative bleeding and therefore was excluded from recurrence and survival analysis. The median size of the tumors was 8 cm (range 5–40), the mean size was 12.4 ± 3.2 cm. The microscopic diagnosis was leiomyosarcoma (n = 9), and malignant fibrous histiocytoma (n = 4). The tumors were graded as low (n = 3) and high (n = 10). The median follow-up was 23 months (range 3–142), the mean was 46.5 months ± 14.7. Recurrences were observed in eight patients (66.6%). The patterns of recurrence according the anatomical location are also shown in Table II.

Five out of eight patients with rectal sarcoma received postoperative radiation therapy, four at doses of 5,000 cGy in 200-cGy fractions delivered to the pelvis in two fields (anterior and posterior) with an 8-MeV linear accelerator or 60-Co unit. The superior limit was chosen at the midpoint of the body of L5; the inferior margin to an imaginary point 2 cm below the anal verge; the lateral margins were marked 1 cm lateral to the medial aspect of

TABLE II. Demographic and Clinical Characteristics of 13 Patients With Colorectal Sarcomas*

Patient No.	Sex	Age (yr)	Symptoms	Location	Operative procedure	Pathology	Survival outcome
1	F	61	Tumor, pain	Rectum	LE	LM	22 mo, DOD, LR, liver
2	M	80	Pain	Rectum	LAR en bloc with prostate + PRT	LM	26 mo, NED
3	F	47	Bleeding	Rectum	LAR	LM	54 mo, DOD, LR, liver, lung
4	M	69	Pain	Rectum	LAR + PRT	MFH	30 mo, DOD, LR
5	F	54	Abscess	Rectum	APR + PRT	LM	14 mo, AWD, liver
6	M	38	Tumor	Rectum	LE + PRT	LM	108 mo, DOD, liver
7	M	56	Tumor, pain	Rectum	APR	MFH	142 mo, DOD, LR
8	M	54	Tumor, bleeding	Rectum	EPT	LM	Operative death
9	M	48	Tumor, pain	Rectum	LE, PRT	LM	8 mo, NED
10	F	44	Tumor, pain	Cecum	Right colectomy	LM	18 mo, DOD, LR, peritoneum, and liver
11	F	70	Tumor, pain, diarrhea	Cecum	Right colectomy	MFH	10 mo, DOD, LR, peritoneum
12	M	30	Pain	Cecum	Right colectomy	MFH	132 mo, NED
13	M	47	Occlusion	Transverse	Left colectomy	LM	6 mo, NED

*LE, local excision; LAR, low anterior resection; PRT, postoperative radiotherapy; APR, abdominoperineal resection; LM, leiomyosarcoma; MFH, malignant fibrous histyocitoma; NED, no evidence of disease; DOD, death of disease; AWD, alive with disease; LR, local recurrence.

the sacroiliac joint. The remaining one patient received 5,000 cGy in 200-cGy fractions delivered to a limited lower pelvic field (10 × 10 cm) using a three-field technique (one posterior and two oblique) with an 8-MEv linear accelerator plus 2,500 rad to the anorectal scar with iridium 192 implants. The recurrence patterns in patients with rectal sarcoma were local (n = 2), distant (n = 2), and local and distant (n = 2); however, local recurrence was observed in one out of five patients (20%) of those who received postoperative radiotherapy (PRT) versus in three out of three (100%) of those who did not ($P = 0.27$). The sites of distant metastatic disease were: liver (n = 3) and liver + lung (n = 1).

The recurrence patterns in patients with colon sarcoma were combined with local and peritoneal dissemination in 50% (2/4) of the patients; the remaining two, are free of disease at 132 and 6 months of follow-up. The overall 5-year survival rate was 40% (excluding the operative death). The 5-year survival for those patients with low-grade tumors was 66%, as compared with 22% for those with high-grade tumors ($P = 0.57$), as depicted in Figure 1.

DISCUSSION

Colorectal sarcomas are uncommon tumors; their incidence has been reported at 0.07–0.12% of all anorectal and colonic malignant tumors [5,9,10]. However, it is difficult to determine the true incidence of this tumor, because most cases are reported as single cases or as series from cancer centers referrals, as in the present series, where the incidence was 1%, which appears higher than in previous reports. The explanation could be that our institution is a nationwide cancer center referral within the Mexican social security system. Several series have reported the rectum as being the predominant location of the colorectal sarcoma [9,11]; in the current series, the same figure was observed.

The main signs and symptoms reported were abdominal or rectal pain and bleeding. In the current series, seven patients had abdominal or rectal tumor, indicating that most patients in our series had delays in their diagnosis; this can be supported with the median size of the tumor (8 cm, range 5–40). In several patients, the first manifestation of a colorectal sarcoma was the inflammatory process. Meijer et al. [11] reported four patients with such characteristics, and all died as a result of progressive metastatic disease. In the current series, one patient developed sepsis due to a rectal abscess; she was treated with debridation, antibiotics, and diverting colostomy; 3 weeks later, an APR was performed, and at 14 months of follow-up, she developed liver metastases. These findings suggest that the inflammatory process could be considered as an ominous prognostic sign. The overall recurrence in the current series was observed in 75% (8/12) of the patients. The most frequent sites of recurrence were to distant sites in 50% of patients, predominantly to the liver, peritoneal dissemination and to the lung. Local recurrence was observed in 50% (6/12) of patients; similar findings were reported by Friesen and Meijer [5,11]. In patients with colonic sarcoma, the failure pattern was to the peritoneal cavity and to local sites in 50% (2/4) of patients, suggesting an aggressive biological behavior in this location, as was previously reported by Meijer et al. [11]. In patients with rectal sarcoma, the failure sites

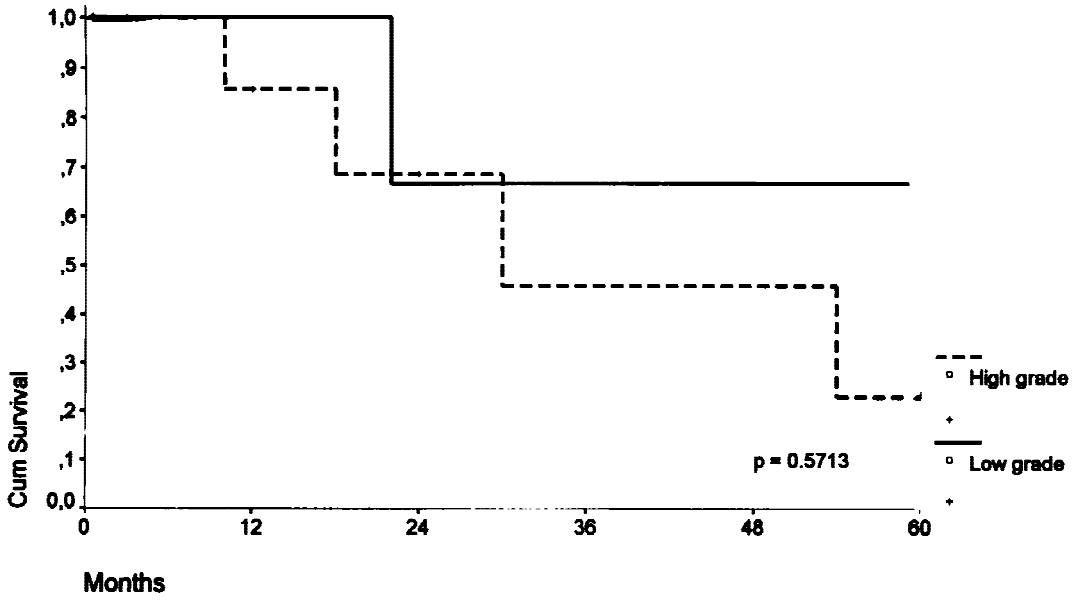

Fig. 1. Five-year survival according to tumor grade.

were both local and/or distant in 75% (6/8) of the cases. However, low frequency of local recurrence was observed in those who received adjuvant radiation therapy (20%) (1/5) versus those who did not (100%) (3/3). These finding suggest that radiation therapy plays an important role in the local control of rectal sarcomas, similar to the results obtained in the treatment of soft tissue sarcomas of the extremities [12]. However, the distant sites of recurrence remain as the main cause of death, and no useful chemotherapy has been reported [13].

Meijer et al. [11] and Akwari et al. [14] reported that the main prognostic factor in colorectal sarcomas is the tumor grade. In the current series, probably because of the small size of the sample, we did not find any statistical difference in terms of 5-year survival, but the survival of those with low-grade tumor was 66% versus 22% for those with high-grade tumor. However, in patients with low-grade tumor, a prolonged follow-up should be recommended, due to the long period of possible recurrence. In the current series, one patient with rectal low-grade tumor developed liver metastases 108 months after treatment of the primary tumor.

One of the main goals in the treatment of rectal adenocarcinoma, squamous cell carcinoma of the anal canal, breast cancer, and soft tissue sarcoma is the preservation of the anatomical organ and its function. In anorectal sarcoma, the goal in selected patients with tumors of <5 cm and with low grade of differentiation is towards anal sphincter preservation. This can be enhanced with conservative surgery and radiation therapy. Recently, Minsky reported three patients treated with local excision and radiation therapy delivered as external beam or brachytherapy, or both, with tumor control and anal sphincter preservation at 20, 25, and 35 months of follow-up [6,7]. In the current series, two patients were treated with conservative multimodality therapy, one with a low anterior resection en bloc with the prostate with a low colorectal anastomosis plus postoperative radiation therapy at doses of 5,000 cGy in 200-cGy fractions delivered to the pelvis with 8 MeV; at 25 months of follow-up, this patient is still alive, maintaining continence of stool, and is free of local recurrence; maintaining continence of stool, and is free of local recurrence; the other patient was treated with a local excision and postoperative radiation therapy at doses of 5,000 cGy in 200-cGy fractions delivered to a limited lower pelvic field plus an iridium 192 implant for a total dose of 7,500 rad, after 100 months the patient had anal continence and was free of local recurrence, but developed liver metastasis and died after 108 months of follow-up.

In conclusion, the recurrence pattern in colorectal sarcoma is to both distant (liver and peritoneal surface) and local sites. In rectal sarcoma, the results of the current series suggest that the administration of adjuvant radiation therapy diminishes the risk of local recurrence, and that in selected patients with small tumors (<5 cm) and low grade of differentiation, it may also allow anal sphincter preservation.

REFERENCES

1. McGrath PC, Neifeld JP, Lawrence W Jr, et al.: Gastrointestinal sarcomas. Analysis of prognostic factors. Ann Surg 1987;206: 706–710.
2. Paty PB, Sigurdson ER: Sarcoma. In Cohen A, Winawer S, Fried-

man MA, Gunderson LL (eds): ''Cancer of the Colon, Rectum and Anus.'' New York: McGraw-Hill, 1995:987–990.
3. Lorez P, Wilson W, Leigh B, Schecter W: Kaposi's sarcoma of the rectum in patients with acquired immunodeficiency syndrome. Am J Surg 1990;160:681–683.
4. Quan SH, Berg JW: Leiomyoma and leiomyosarcoma of the rectum. Dis Colon Rectum 1962;5:415–25.
5. Khalifa AA, Bong WL, Rao VK, Williams MJ: Leiomyosarcoma of the rectum. Report of a case and review of the literature. Dis Colon Rectum 1986;29:427–432.
6. Minsky BD, Cohen AM, Hajdu SI: Conservative management of anal leiomyosarcoma. Cancer 1991;68:1640–1643.
7. Minsky BD, Cohen AM, Hajdu SI: Sphincter preservation in rectal sarcoma. Dis Colon Rectum 1990;33:319–322.
8. Kaplan E, Meier P. Nonparametric estimation from incomplete observations. J Am Stat Assoc 1957;53:457–481.
9. Friesen R, Moyana TN, Murray RB, et al.: Colorectal leiomyosarcomas: A pathobiologic study with long-term follow-up. Can J Surg 1992;35:505–508.
10. Feldtman RW, Oram-Smith JC, Teears RJ, Kircher T: Leiomyosarcoma of the rectum: The military experience. Dis Colon Rectum 1981;24:402–403.
11. Meijer S, Peretz T, Gaynor JJ, et al.: Primary colorectal sarcoma: A retrospective review and prognostic factor study of 50 consecutive patients. Arch Surg 1990;125:1163–1168.
12. Yang JC, Chang AE, Baker AR, et al.: Randomized prospective study of the benefit of adjuvant radiation therapy in the treatment of soft tissue sarcomas of the extremity. J Clin Oncol 1998;16: 197–203.
13. Kraybill WG, Emami B, Lyss AP: Management of soft tissue sarcomas of the extremities. Surgery 1991;109:233–235.
14. Akwari OE, Dozois RR, Weiland LH, Beahrs OH: Leiomyosarcoma of the small and and large bowel. Cancer 1978;42:1375–1384.